A cell for the electrowinning of aluminium comprises a plurality of metal-based anodes facing and spaced apart from an aluminium-wettable drained cathode surface on which aluminium is produced. The drained cathode surface is formed along the cell by upper surfaces of a series of juxtaposed carbon cathode blocks, the cathode blocks extending across the cell. The drained cathode surface is divided into quadrants by a longitudinal aluminium collection groove along the cell and by a central aluminium collection reservoir across the cell. Pairs of quadrants across the cell are inclined in a V-shape relationship, the collection groove being located along the bottom of the V-shape and arranged to collect molten aluminium draining from the drained cathode surface and evacuate it into the aluminium collection reservoir during cell operation.